

SWI/SNF chromatin remodeling complex is required for initiation of sex-dependent differentiation in mouse germline

生物学専攻 幹細胞学

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Sexual reproduction involves the creation of sex-dependent gametes, oocytes and sperm. In mammals, sexually dimorphic differentiation commences in the primordial germ cells (PGCs) in embryonic gonads; PGCs in ovaries and testes differentiate into meiotic primary oocytes and mitotically quiescent prospermatogonia, respectively. Here, I show that the transition from PGCs to sex-specific germ cells was abrogated in conditional knockout mice carrying a null mutation of *Smarchb1* (also known as *Snf5*) gene, which encodes a core subunit of the SWI/SNF chromatin remodeling complex. In female mutant mice, failure to upregulate meiosis-related genes resulted in impaired meiotic entry and progression, including defects in synapsis formation and DNA double strand break repair. Mutant male mice exhibited delayed mitotic arrest and DNA hypomethylation in retrotransposons and imprinted genes, resulting from aberrant expression of genes related to growth and de novo DNA methylation. Collectively, my results demonstrate that the SWI/SNF complex is required for transcriptional reprogramming in the initiation of sex-dependent differentiation of germ cells. Finally, in combination with ATAC-seq and ChIP-seq datasets, I propose the mechanisms whereby SWI/SNF complex orchestrates the dynamic transcriptional reprogramming during sex differentiation.